Claims

1. In a semiconductor element formed with a semiconductor substrate for detecting organic molecules, the semiconductor element having a photoelectric converter and an organic molecule probe disposition region, the improvement comprising:

the photoelectric converter being disposed on a first main side of the semiconductor substrate and an organic molecule probe disposition region being disposed on a second main side of the semiconductor substrate.

2. The semiconductor element of claim 1, further comprising:

an optical filter formed on the second main side at least at the location corresponding to the organic molecule probe disposition region.

3. The semiconductor element of claim 2 in which the semiconductor substrate has a thickness from the organic molecule probe disposition region on the second main side to the photoelectric converter on the first main side determined according to the depth of a CCD potential well.

4. The semiconductor element of claim 1 in which the semiconductor substrate has a thickness from the organic molecule probe disposition region on the second main side to the photoelectric converter on the first main side determined according to the depth of a CCD potential well.

5. A semiconductor device formed with a semiconductor substrate for detecting organic molecules, comprising:

a plurality of photoelectric converters disposed on a first main side of the semiconductor substrate and organic molecule probe disposition regions provided on a second main side in alignment with the photoelectric converters.

6. The semiconductor device of claim 5 in which the semiconductor substrate includes a photoelectric converter region in which the plurality of the photoelectric converters are disposed on the first main side as a CCD solid-state imaging device.

7. The semiconductor device of claim 6 further comprising an optical filter formed in at least the organic molecule probe disposition regions on the second main side of the semiconductor substrate.

8. The semiconductor device of claim 7 further comprising a plurality of recesses corresponding to the organic molecule probe disposition regions are provided on the second main side.

9. The semiconductor device of claim 6 further comprising a plurality of recesses corresponding to the organic molecule probe disposition regions are provided on the second main side.

10. The semiconductor device of claim 5 further comprising an optical filter formed in at least the organic molecule probe disposition regions on the second main side of the semiconductor substrate.

11. The semiconductor device of claim 5 further comprising a plurality of recesses corresponding to the organic molecule probe disposition regions are provided on the second main side.

12. A method for measuring organic molecules using a semiconductor device as recited in claim 5, comprising the steps of:

fixing at least one type of organic molecule probe in the organic molecule probe disposition region on the second main side;

placing a fluorescent-labeled sample onto the second main side and bonding to the organic molecule probe a target in the sample having a molecular structure corresponding to the organic molecule probe ;

irradiating with excitation light the second main side to which the organic molecule probe has been fixed; and

detecting the fluorescent light produced by irradiation with the excitation light by means of the photoelectric converters disposed on the first main side, and outputting an optical signal.

13. A method for measuring organic molecules using a semiconductor device as recited in claim 6, comprising the steps of:

fixing at least one type of organic molecule probe in the organic molecule probe disposition region on the second main side;

placing a fluorescent-labeled sample onto the second main side and bonding to the organic molecule probe a target in the sample having a molecular structure corresponding to the organic molecule probe ;

irradiating with excitation light the second main side to which the organic molecule probe has been fixed; and

detecting the fluorescent light produced by irradiation with the excitation light by means of the photoelectric converters disposed on the first main side, and outputting an optical signal.

14. A method for measuring organic molecules using a semiconductor device as recited in claim 7, comprising the steps of:

fixing at least one type of organic molecule probe in the organic molecule probe disposition region on the second main side;

placing a fluorescent-labeled sample onto the second main side and bonding to the organic molecule probe a target in the sample having a molecular structure corresponding to the organic molecule probe ;

irradiating with excitation light the second main side to which the organic molecule probe has been fixed; and

detecting the fluorescent light produced by irradiation with the excitation light by means of the photoelectric converters disposed on the first main side, and outputting an optical signal.

15. A method for measuring organic molecules using a semiconductor device as recited in claim 8, comprising the steps of:

fixing at least one type of organic molecule probe in the organic molecule probe disposition region on the second main side;

placing a fluorescent-labeled sample onto the second main side and bonding to the organic molecule probe a target in the sample having a molecular structure corresponding to the organic molecule probe ;

irradiating with excitation light the second main side to which the organic molecule probe has been fixed; and

detecting the fluorescent light produced by irradiation with the excitation light by means of the photoelectric converters disposed on the first main side, and outputting an optical signal.

16. The method for measuring organic molecules of claim 12, in which organic molecule probes with different molecular structures are fixed to different ones of the plurality of organic molecule probe disposition regions disposed on the second main side.

17. A method of manufacturing semiconductor device for detecting organic molecules, comprising:

forming on a semiconductor substrate a plurality of photoelectric converters disposed on a first main side of the semiconductor substrate; and

forming a plurality of organic molecule probe disposition regions on a second main side in alignment with the photoelectric converters.

18. The method claim 17 in which the plurality of the photoelectric converters are disposed on the first main side as a CCD solid-state imaging device.

19. The method of claim 17 further comprising forming optical filters in at least the organic molecule probe disposition regions on the second main side of the semiconductor substrate.

20. The method of claim 17 further comprising forming a plurality of recesses corresponding to the organic molecule probe disposition regions on the second main side.

21. The method of claim 20 further comprising forming optical filters in at least the organic molecule probe disposition regions on the second main side of the semiconductor substrate.